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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/451,979	11/30/1999	KATSUMI SAMESHIMA	362-39	9727

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EXAMINER
LOUIE, WAI SING

ART UNIT	PAPER NUMBER
2814	

DATE MAILED: 05/21/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/451,979	Applicant(s) SAMESHIMA, KATSUMI	
	Examiner Wai-Sing Louie	Art Unit 2814	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 April 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

4) ☐ Interview Summary (PTO-413) Paper No(s). _____

5) ☐ Notice of Informal Patent Application (PTO-152)

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by Onishi (US 5,708,284).

With regard to claim 1, Onishi discloses a non-volatile random access memory (col. 5, line 30 to col. 11, line 7 and fig. 6) comprising:

- An insulation film 7 having a concave portion at a top surface;
- A laminated body obtained by laminating a plurality of layers on the top surface including a region of the plurality of layers corresponding to a region other than

is brought into contact with a bottom surface of the

ferroelectric layer 9 formed on the lower electrode 8 and an upper electrode layer 10 formed on the ferroelectric layer 9, where a portion of the lower electrode layer 8 protrude outward from an inner peripheral edge forming the concave portion, and a side of the portion of the lower electrode layer 8, a side of the ferroelectric layer 9 and a side of the upper electrode layer 10 are flush with each other (fig. 6);

- A film 8a formed in a bottom of the hollow and separating between the insulating film 7 and the lower electrode layer 8b (fig. 6).

Claim 2 is rejected under 35 U.S.C. 102(e) as being anticipated by Zurcher et al. (US 6,344,413).

With regard to claim 2, Zurcher et al. disclose a memory device (col. 2, line 23 to col. 9, line 53 and fig. 7) comprising:

- An insulation film 60 having a hollow 69 at a top surface 66 (fig. 4);
- A laminated body obtained by laminating a plurality of layers on the top surface and etching a region of the plurality of layers corresponding to a region other than the hollow 69 (col. 4, lines 11-14), where the laminated body includes a lower electrode layer 70 which is brought into contact with a bottom surface of the concave portion 69 (fig. 5), a ferroelectric layer 75 formed on the lower electrode layer 70 (fig. 6) and an upper electrode layer 80 formed on the ferroelectric layer

- The memory device further comprising another film 55 embedded from the top surface 66 of the insulation film 60 in a position of a predetermined depth, exposed only at a bottom of the hollow 69 (fig. 4) and separating between the insulation film 45 and the lower electrode layer 70 in the hollow 69, the another film 55 being an etch stop for forming the hollow 69 to the predetermined depth (col. 2, lines 50-65).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Onishi (US 5,708,284) in view of Roberts et al. (US 5,861,344).

With regard to claim 3, Onishi discloses a non-volatile random access memory comprising:

- An insulation film 7 having a hollow at a top surface;
- A laminated body obtained by laminating a plurality of layers on the top surface [illegible] of the plurality of layers corresponding to a region other than

layer 9 formed on the lower electrode 8 and an upper electrode layer 10 formed on the ferroelectric layer 9 (fig. 6):

- The lower electrode layer includes a first electrode portion 8a and a second portion 8b formed on the first electrode portion 8a, but Onishi does not disclose the first electrode portion 8a formed only at a corner of the hollow. However, Roberts et al. disclose forming an improved electrical contact by depositing the corner fill 32 in the hollow (Roberts col. 7, lines 19-30 and fig. 3 and 4). Roberts et al. teach the first electrode portion acts as seeding material and selective deposit at the corner (Roberts col. 2, lines 41-44) and improves metal contact in the hollow (col. 7, lines 19-23). Therefore, it would have been obvious for the one with ordinary skill in the art to modify Onishi with the teaching of Roberts et al. to provide the corner fill in the hollow in order to establish the seeding material and improves metal contact in the hollow.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Onishi (US 5,708,284) in view of Zurcher et al. (US 6,344,413).

With regard to claim 4, Onishi does not disclose the lower electrode is formed on a surface of a thin film of the same material as that of the lower electrode. However, Zurcher et al. disclose a thin film of titanium may be deposited on top of the first conductive layer 14 (Zurcher col. 7, lines 7-8). Zurcher et al. teach the thin film serves as an adhesion layer (Zurcher col. 7,

order to improve the adhesion to the lower electrode. The first conductive layer 14 is made of titanium, which is the same material as the thin film.

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Onishi (US 5,708,284) in view of Hanagasaki (US 5,767,541).

With regard to claim 5, Onishi does not disclose the top surfaces of lower electrode and the insulating film are planarized flush with each other. However, Hanagasaki discloses the lower electrode is planarized flush with the insulating film (Hanagasaki fig. 1E). Hanagasaki teaches planarization could remove surface irregularity (Hanagasaki col. 7, line 37). Therefore, it would have been obvious to one with ordinary skill in the art to modified Onishi's device with the teaching of Hanagasaki to planarize the top surface of lower electrode flush with the insulating film in order to remove the surface irregularity.

Response to Arguments

Applicant's arguments filed 4/25/03 have been fully considered:

- Applicant pointed out that the previous office action does not fully address claim 2 and amendment was made to emphasize that an additional film which is embedded from the top of the insulation film in position of a predetermined depth is exposed only at a bottom of the hollow as shown in fig. 9. The film is made of

claim 2 has been fully addressed in this office action. Please see the rejection above.

- Applicant pointed out that Onishi does not disclose the lower electrode layer is formed only at the corner of the hollow. Claim 3 is amended to address the corner fill in the hollow. This limitation has been fully considered. Please see the rejection above.
- Applicant pointed out that Onishi does not disclose a thin film in between the lower electrode 8a and 8b. However, Onishi modified by Zurcher et al. would disclose the thin film. Please see the rejection above.
- Applicant argues that there is no need for Onishi to planarize the lower electrode 8 flush with the insulation film 7. However, Hanagasaki teaches planarization could remove surface irregularity (Hanagasaki col. 7, line 37). This provides the motivation for Onishi to to planarize the surface of the lower electrode 8 in order to provide a smooth surface for the deposition of ferroelectric layer. The combination of Onishi and Hanagasaki is proper.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wai-Sing Louie whose telephone number is (703) 305-0474. The examiner can normally be reached on 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

LONG PHAM
PRIMARY EXAMINER

wsl
May 9, 2003